

Amendments to the Claims:

1. (Currently Amended) A metering pump, comprising:
an actuating mechanism, ~~and~~
a plurality of non-rotating piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders,
a piston housed within the first cylinder, and
a piston housed within the second cylinder, the piston of the first cylinder having a stroke that differs from the piston of the second cylinder.

alternates
up and down

B1

multiple
pistons
individual
adjust

2. (Canceled)

3. (Currently Amended) The metering pump of claim 12 wherein the first cylinder is spaced from the actuating mechanism a distance that differs from a spacing of the second cylinder from the actuating mechanism.

4. (Original) The metering pump of claim 3 further comprising an adjustment mechanism configured to vary the spacing of the cylinders from the actuating mechanism.

5. (Original) The metering pump of claim 4 wherein the cylinders are pivotably connected to a housing and the adjustment mechanism comprises a screw and nut.

6. (Original) The metering pump of claim 1 wherein the first cylinder has a dimension defining an inner volume that differs from a corresponding dimension of the second cylinder.

7. (Original) The metering pump of claim 6 wherein the dimension is an inner diameter of the cylinder.

8. (Original) The metering pump of claim 1 comprising at least three cylinders.

9. (Original) The metering pump of claim 8 wherein each cylinder has a working volume that differs from the other cylinders.

10. (Original) The metering pump of claim 1 wherein the actuating mechanism comprises a transition arm coupled to a stationary support and a rotary member.

B' 11. (Original) The metering pump of claim 10 wherein the transition arm is coupled to the stationary support by a U-joint. *Or*

12. (Original) The metering pump of claim 10 wherein the transition arm includes a plurality of drive arms and a plurality of joints, each drive arm being coupling to one of the cylinders by a respective joint.

13. (Original) The metering pump of claim 12 wherein the joint provides three degrees of freedom.

14. (Original) The metering pump of claim 13 wherein the joint provides four degrees of freedom.

15. (Original) The metering pump of claim 1 wherein the actuating mechanism is centrally located.

*102 b
9/22 p. 101 a. 1. x* 16. (Previously Presented) A metering pump, comprising:

a transition arm coupled to a stationary support and a rotary member, and
a plurality of piston cylinders arranged radially about the transition arm and coupled to
the transition arm,

wherein at least part of the transition arm is centrally located between the piston cylinders
and wherein the stationary support is positioned such that an axis of rotation of the rotary
member passes through the stationary support.

17. (Previously Presented) A method of metering fluids, comprising:
independently adjusting stroke of one piston of a plurality of pistons to adjust the volume
of metered fluid, each piston being housed within a cylinder having a fluid inlet and a metered
fluid outlet, and

selecting different cylinder diameters to adjust the volume of metered fluid.

18. (Canceled)

19. (Previously Presented) A metering pump, comprising:
an actuating mechanism, and
a plurality of piston cylinders arranged radially about the actuating mechanism and
coupled to the actuating mechanism, a first of the cylinders having a working volume that differs
from a second of the cylinders,

wherein the actuating mechanism comprises a transition arm coupled to a stationary
support by a U-joint and to a rotary member,

20. (Previously Presented) A metering pump, comprising:

an actuating mechanism, and

a plurality of piston cylinders arranged radially about the actuating mechanism and
coupled to the actuating mechanism, a first of the cylinders having a working volume that differs
from a second of the cylinders,

wherein the actuating mechanism comprises a transition arm coupled to a stationary member and a rotary member and wherein the transition arm includes a plurality of drive arms and a plurality of joints, each drive arm being coupled to one of the cylinders by a respective joint.

21. (Previously Presented) The metering pump of claim 20 wherein the joint provides three degrees of freedom.

22. (Previously Presented) The metering pump of claim 20 wherein the joint provides four degrees of freedom.

B¹
✓
23. (Currently Amended) A metering pump, comprising:
a drive shaft;
an actuating mechanism coupled to the drive shaft, and
a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders,
wherein at least part of the actuating mechanism is located between the piston cylinders.

✓
24. (Previously Presented) The metering pump of claim 23 wherein the actuating mechanism comprises a transition arm coupled to a stationary support and a rotary member.

25. (Previously Presented) The metering pump of claim 24 wherein the transition arm is coupled to the stationary support by a U-joint

✓
26. (Previously Presented) The metering pump of claim 23 wherein the actuating mechanism is centrally located.

27. (Currently Amended) A metering pump, comprising:
a centrally located actuating mechanism including a transition arm coupled to a stationary support by a U-joint and to a rotary member, and
a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism;
~~wherein in at least one operating configuration the axis of rotation of the rotary member and the longitudinal axis of at least one piston are parallel.~~

102/5

B! 28. (Previously Presented) A metering pump, comprising:
an actuating mechanism, and
a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders,
wherein the actuating mechanism comprises a transition arm coupled to a stationary support by a U-joint.

102/6
103/6/10/1

29. (Currently Amended) A metering pump, comprising:
an actuating mechanism, and
a plurality of fluid-pumping piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders,
wherein ~~the~~ an axis of the first cylinder is spaced from the actuating mechanism a distance that differs from a spacing of ~~the~~ an axis of the second cylinder from the actuating mechanism.

103/6/10/1
actuator point

30. (Previously Presented) A metering pump, comprising:
an actuating mechanism,

a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders, and

an adjustment mechanism configured to independently vary the spacing of one piston cylinder of the plurality of piston cylinders from the actuating mechanism to independently adjust the stroke of a piston in the one piston cylinder.

define how

152h are
B' 31. (Currently Amended) A metering pump, comprising:
an actuating mechanism, and
a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, wherein each cylinder of the plurality of cylinders has a working volume that differs from the other cylinders and at least part of the actuating mechanism is centrally located between the piston cylinders.

how about shaft

32. (Withdrawn) A method of mixing fluids, comprising:
selecting different cylinder diameters to coarsely adjust a mix percentage of a plurality of fluids in a mixture, each cylinder housing a piston that pumps one of the plurality of fluids into the mixture; and
adjusting the stroke of each piston in each cylinder to finely adjust the mix percentage of the plurality of fluids in the mixture.

253 faster
33. (Amended) A pump for mixing fluids, comprising:
an actuating mechanism;
a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, each cylinder housing a piston that pumps one of a plurality of fluids into a mixture and each cylinder having a working volume chosen to coarsely adjust a mix percentage of each fluid in the mixture; and

an adjustment mechanism configured to independently adjust the stroke of each piston in each cylinder to finely adjust the mix percentage of each fluid in the mixture.

157

what if we have 2 cyl in Forster

34. (Previously Presented) The method of claim 17 wherein independently adjusting stroke of one piston includes independently adjusting stroke of each piston of the plurality of pistons.

? Forster

35. (New) The method of claim 27 wherein in at least one operating configuration the axis of rotation of the rotary member and the longitudinal axis of at least one piston are parallel

36. (New) A metering pump, comprising:
an actuating mechanism including a transition arm coupled to a stationary support by a U-joint and coupled to a rotary member,
a plurality of non-rotating piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders.

B1

102 b pump with gas

37. (New) A metering pump, comprising:
an actuating mechanism including a transition arm coupled to a stationary support and a rotary member, the transition arm including a plurality of drive arms and a plurality of joints,
deck a plurality of non-rotating piston cylinders arranged radially about the actuating mechanism, each drive arm being coupling to one of the cylinders by a respective joint, a first of the cylinders having a working volume that differs from a second of the cylinders.

*102 b
9m
+ gas*

38. (New) The metering pump of claim 37 wherein the joint provides three degrees of freedom.

39. (New) The metering pump of claim 38 wherein the joint provides four degrees of freedom.

40. (New) A metering pump, comprising:
an actuating mechanism including a transition arm coupled to a stationary support by a
U-joint and coupled to a rotary member, and
a plurality of piston cylinders arranged radially about the actuating mechanism and
coupled to the actuating mechanism, a first of the cylinders having a working volume that differs
from a second of the cylinders,
wherein at least part of the actuating mechanism is located between the piston cylinders.

WJB/asm
gwb

B1
41. (New) The metering pump of claim 1, wherein the first cylinder has a first inlet
port and a first outlet port, the second cylinder has a second inlet port and a second outlet port,
and the first inlet port and the second inlet port are isolated from each other.

42. (New) The metering pump of claim 16, wherein a first cylinder of the plurality of
piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of
piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the
second inlet port are isolated from each other.

obk 17
43. (New) The metering pump of claim 17, wherein a first cylinder has a first inlet
and a first outlet, a second cylinder has a second inlet and a second outlet, and the first inlet and
the second inlet are isolated from each other.

44. (New) The metering pump of claim 18, wherein a first cylinder of the plurality of
piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of
piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the
second inlet port are isolated from each other.

over 1

✓ 45. (New) The metering pump of claim 19, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

✓ 46. (New) The metering pump of claim 20, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

B1 ✓ 47. (New) The metering pump of claim 23, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

✓ 48. (New) The metering pump of claim 27, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

✓ 49. (New) The metering pump of claim 28, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

✓ 1R 29 50. (New) The metering pump of claim 29, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of

piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

51. (New) The metering pump of claim 30, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

B' 31 52. (New) The metering pump of claim 31, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

33 53. (New) The metering pump of claim 33, wherein a first cylinder of the plurality of piston cylinders has a first inlet port and a first outlet port, a second cylinder of the plurality of piston cylinders has a second inlet port and a second outlet port, and the first inlet port and the second inlet port are isolated from each other.

54. (New) The metering pump of claim 24 wherein the rotary member is coupled to the drive shaft.

nb 11 55. (New) A metering pump, comprising: 102 b 229
an actuating mechanism including a transition arm coupled to a rotary member configured to rotate about an axis intersecting the rotary member, the transition arm including a drive member coupled to the rotary member off-axis of the rotary member, the drive member configured to circumscribe a circle about the axis while other portions of the transition arm are non-rotating about the axis, and

a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism, a first of the cylinders having a working volume that differs from a second of the cylinders.

56. (New) A metering pump, comprising:

152 WPP

B1
deck a centrally located actuating mechanism including a transition arm coupled to a rotary member configured to rotate about an axis intersecting the rotary member, the transition arm including a drive member coupled to the rotary member off-axis of the rotary member, the drive member configured to circumscribe a circle about the axis while other portions of the transition arm are non-rotating about the axis, and

a plurality of piston cylinders arranged radially about the actuating mechanism and coupled to the actuating mechanism.
